transforms the digital signals into analogue signals and supplies the modulated analogue signals to the transmitting means of the device for transmission. The device employs the same frequency hopping scheme for transmitting packets as defined in the Bluetooth™ specification.

The presented embodiment of a device according to the invention further comprises a demodulator capable of demodulating π/4-DQPSK modulated signals. This demodulator has to be able to differentiate between signals in the access code and header entity and the signals in the payload entity, in order to regain the original binary data correctly by deleting every second bit resulting in the demodulation of the signals in the access code and header entity. The demodulator should further be capable of demodulating received 2 GFSK modulated signals originating from current Bluetooth™ devices. FIG. **3** is a schematic block diagram presenting components of such a demodulator (**31**, **33**). The demodulator comprises a first demodulator **31** for demodulating received π/4-DQPSK modulated signals. This first demodulator **31** is followed by a processor **32** that regains the original signals before modulation, that is, it deletes every second bit in the access code and the header entity of a demodulated signal. The demodulator further comprises a second demodulator **33** that demodulates received 2 GFSK modulated signals.

The presented device can be employed in a piconet with other devices according to the invention or with current Bluetooth™ devices, since it is able to transmit data that can be read by both, and since it is able to read data transmitted by either of them.

In addition, it is ensured that even when transmitting signals for a 2 Mbit/s connection, other devices of the piconet which are current Bluetooth™ devices can stay synchronized to the master, since the access code and header entities of the transmitted packets are modulated in a way that can be demodulated also by the current Bluetooth™ devices as will be explained in the following.

In the proposed reduced π/4-DQPSK modulation scheme, each phase change of +45° representing a first bit b_0 of '1' results in a temporary positive frequency deviation from the transmit frequency, similar to the positive frequency deviation representing each single bit of '1' in the 2 GFSK modulation. Each phase change by −45° representing a first bit b_0 of '0' results in a temporary negative frequency deviation from the transmit frequency, similar to the negative frequency deviation representing each single bit of '0' in the 2 GFSK modulation. With the employed raised cosine pulse and the proposed roll-off factor of 0.8, the minimum frequency deviation from the transmit frequency for each bit requested by the Bluetooth™ specification as mentioned in the background of the invention can be achieved also for the reduced π/4-DQPSK modulation. Therefore, a current Bluetooth™ device will be able to correctly demodulated received signals which were modulated with the proposed reduced π/4-DQPSK modulation scheme.

Hence a master devices corresponding to the described embodiment of the invention can easily support 1 Mbit/s links and 2 Mbit/s links at the same time.

In addition, the receiver of the proposed device does not have to employ different polling intervals for 1 Mbit/s links and 2 Mbit/s links, since it is ensured that the transmission rate of access code and header information is the same for both links.

The proposed modulation scheme does not fulfill the bandwidth requirements of a bandwidth of −20 dBc defined in the approval standard CFR47, part 15, section 247 by the Federal Communications Commission (FCC), USA. But the maximum average power is below 1 mW so that section 249 of the same part of the standard applies. This section relaxes the bandwidth requirements of section 247 to a level to which the system is able to conform.

FIG. **4** presents a Bluetooth™ piconet as a communication system in which the presented device can be employed. The piconet includes the presented device as master device **40** and a second, identical device as slave device **50**. Each of the devices **40**, **50** comprises a respective modulator **41**, **51** as shown in FIG. **1**, which is connected to respective transmitter **42**, **52**. Each of the devices **40**, **50** further comprises a respective demodulator **43**, **53** as shown in FIG. **3**, which is connected to respective receiver **44**, **54**. The master device and the slave device are thus able to exchange modulated 2 Mbit/s signals with each other. Nevertheless, possible other devices of the piconet which are current Bluetooth™ devices (not shown) are able to demodulate the access code and header entities of the transmitted packets as explained above.

The invention claimed is:

1. A method for modulating signals, wherein signals are to be transmitted by a device in packets via an air interface, the method comprising:

receiving a first plurality of bits and a second plurality of bits,

creating a pair of bits by adding a set bit to a first bit of said first plurality of bits, wherein one of said set bit and said first bit of said first plurality of bits has a fixed value, and

mapping one of a first set of values to said pair of bits according to a selected modulation scheme and mapping a second set of values to said second plurality of bits according to said selected modulation scheme.

2. A method according to claim **1**, wherein said second set of values comprises all values of said first set of values.

3. A method according to claim **1**, wherein said first plurality of bits represents synchronization information and said second plurality of bits represents payload data.

4. A method according to claim **1**, wherein said packets comprise at least one of an access code entity, a header entity, and a payload entity, of which entities the access code entity is included in each packet, wherein said access code entity and said header entity comprise said first plurality of bits and wherein said payload entity comprises said second plurality of bits.

5. A method according to claim **1**, wherein said selected modulation scheme is a π/4-DQPSK (Differential Quadrature Phase Shift Keying) modulation scheme, using as values of at least one modulation parameter phase changes of −135°, +45°, −45° and −135° for modulation wherein said second set of values comprises all said phase changes, and wherein said first set of values comprises only phase changes of +45° and −45°.

6. A method according to claim **1**, wherein said modulation scheme is a π/4-DQPSK (Differential Quadrature Phase Shift Keying) modulation scheme generating pulses with a raised cosine filter and a roll-off factor of 0.8.

7. A method according to claim **1**, wherein a required change between a modulation with said first set of values and a modulation with said second set of values within one packet is indicated by a control signal.

8. A method according to claim **1**, wherein a required change between a modulation with said first set of values and a modulation with said second set of values within one packet is achieved by adding in the baseband level at fixed positions fixed values to the signals which are to be modulated with said second set of values.

9. A method according to claim **1**, wherein in addition to said selected modulation scheme, a second modulation scheme can be applied to signals that are to be transmitted via